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THE USAF FIGHTER FORCE STRUCTURE
IN THE 2020-2040 TIMEFRAME

by

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Biography

Colonel Todd S. Bakita is currently assigned as a student of the Air War College, Maxwell Air Force Base, Alabama. He has served in a variety of acquisition assignments on the B-2, B-52, and F-16 weapon systems. Prior to arriving at Air War College, Colonel Bakita served as interim commander of the 638th Aeronautical System Squadron, an F-16 acquisition unit located at Wright-Patterson Air Force Base, Ohio. He was responsible for \$3B in F-16 upgrades and modernization programs affecting over 900 aircraft operated by the United States Air Force and five European countries. Colonel Bakita holds a Bachelor of Science degree in Electrical Engineering from Michigan State University and a Master of Science degree in Electrical Engineering from the University of Maryland. His professional military education includes Squadron Officer School by correspondence and residence, Air Command and Staff College by correspondence, and Air War College by correspondence.

Introduction

The USAF *capability gap* during transition from 4th to 5th generation aircraft requires timely analysis, debate, and resolution for the United States to effectively implement a security strategy during the 2020–2040 timeframe. As described by Drew & Snow in *The Making of 21st Century Strategy*, the military facets of our national security strategy are force development, deployment, employment, and coordination of those elements against perceived threats.¹ The fundamental objective of force development is acquiring cost-effective means that are necessary to deter and defeat the myriad of threats to our national interests.

The strategic implication of the USAF capability gap during transition from 4th to 5th generation aircraft is among the many recapitalization issues confronting the United States military. Within a global environment growing in complexity and increasing the spectrums of potential conflict, the USAF must continue to modernize the fighter fleet to meet near, mid, and long-term combat capability requirements. Key to this argument is the net assessment of our combat capability. The USAF must remain capable to deter and defeat adversaries that threaten our national interests – and the adversary gets a vote.

As the underlying core principle for air warfare, the USAF has historically achieved and maintained *air superiority* with our fighter fleet of manned aircraft. In large part, air superiority (and *global precision attack*) resulted from the relative strength of our fighter force to any potential opponent by synergistic effects of the following:²

- Technically superior aircraft – flight performance, avionics, and armament.
- Numerical sufficiency.
- Exceptionally trained pilots and crews

All three elements are essential for air superiority over the modern battlefield, frequently characterized as *hybrid warfare*.ⁱ Technical superiority alone is insufficient – numbers and training still matter. To deter and defeat the myriad of threats against our national interests, the USAF requires sufficient multi-role fighters to perform air-to-air combat; air-to-ground strike missions with precision-guided munitions; and non-traditional intelligence, surveillance, and reconnaissance (NTISR) missions.³

Entering the second decade of the 21st century, the size and capability of the USAF remains an essential mechanism to defend our national interests. Reliance on the fighter fleet will continue in succeeding decades. Nevertheless, the superiority of USAF capability against foreseen threats is doubtful because of an emerging *Perfect Storm* of interrelated factors. These put our national policy makers between the proverbial “rock and a hard place.” While the future threat environment becomes more diverse, complex, and dangerous, the aggregate combat capability of our aging USAF fighter fleet is projected to degrade throughout the 2020–2040 timeframe. The F-35 Lightning has become the primary obstacle to recapitalizing the fleet because chronic problems have delayed the delivery and increased the cost of this 5th generation multi-role aircraft.⁴ Further complicating this force development problem, future DOD budgets will likely face intense domestic pressure that ostensibly restricts USAF from fixing this capability gap.

This impending *train-wreck* of unprecedented consequence to USAF combat capability necessitates a cost-effective bridge to transition the fighter fleet from 4th to 5th generation multi-role aircraft. The F-16 *Super Falcon*ⁱⁱ is singularly distinctive among potential solutions because

ⁱ The term *hybrid warfare* describes the simultaneous blend of conventional and irregular combat; the former employs symmetrical “force-on-force” means and methods, the latter exploits asymmetrical capabilities.

the jet is available, affordable, and adaptable to the vast mission requirements of the hybrid warfare. In addition to fixing the USAF capability gap from 2020 thru 2040, the acquisition of F-16 Super Falcons would alleviate F-35 Litening program risk. The USAF could partially fund a Super Falcon fleet with risk money reserved to cover the lengthy overlap of F-35 development and production phases. This strategy would save additional money by negating the need for cost-type contracts to buy initial allotments of F-35s over the next decade.

Why does the USAF need the *Super Falcon*?

The USAF capability gap during transition from 4th to 5th generation aircraft has emerged from a *Perfect Storm* of interrelated factors. These include the increasing complexity and diversity of national interests and risks; increase of aging effects on legacy 4th generation aircraft; repeated schedule delays and cost increases for the F-35 Litening; and intense domestic pressure on future DOD budgets.

The National Defense Strategy of 2008 addressed the full realm of threats to US security interests.⁵ The primary state threats were Russia, China, and the remaining “Axis of Evil” – Iran and North Korea. Resurgence of a nationalist Russia has been demonstrated by its 2008 war with Georgia and renewal of bomber penetrations into the Alaskan Air Defense Zone. While China’s emergence as a near peer is well documented, their strategic intentions remain unclear. This poses unknown risk to national interests of the United States. Iran and North Korea are particularly troublesome because they are located in regions of strategic interest and actively pursue policies against US allies. These rogue states can undermine any UN-sponsored

ⁱⁱ The term *Super Falcon* was coined by the author to reflect F-16s with advanced combat capability, which are commonly referred as 4.5 generation aircraft. This is akin to reference of F-18 E/F aircraft as *Super Hornets*.

multilateral policy because Iran has strong economic ties with Russia, and North Korea is traditionally supported by China.

The NDS of 2008 also addressed the growing relevance of other threats – climate change, famine, national disasters, pandemics, and Violent Non-State Actors (VNSA).⁶ The latter threat included terrorists, warlords, militias, organized crime networks. Furthermore, the NSS of 2006 concluded that instability brought about by non-state threats can create a failed state environment that breeds and fosters the emergence of VNSA.

The realm of threats to US security interests has resulted in unprecedented deployment and employment of military forces during the first decade of the 21st century. Historically, the USAF fighter fleet's role in deterrence against state threats required forward deployment to corresponding theaters. For this purpose, the USAF garrisoned F-16 squadrons in the Far East and Europe; the latter jets are required by NATO agreements that continued after the Cold War. The terrorist attacks of 9/11 and resultant GWOT were catalysts for unprecedented transformation of the United States military (especially the Army and Air Force) from independent, largely garrisoned units into expeditionary forces. The post 9/11 high operational tempo also transformed the Air National Guard (ANG) fleet, which performs Air Sovereignty Alert missions for NORTHCOM.⁷ Furthermore, ANG units have deployed along side USAF active duty units in support of OIF. Due to revised strategies by the Obama Administration, these AEF rotations are transitioning to the OEF theater.

While the post 9/11 missions of the United States military increasingly grow more complex and multifaceted, the USAF fighter fleet of legacy 4th generation aircraft shows adverse effects from the operational strains of the past decade. Average age of USAF F-16 and F-15 fleets has crept above 17 and 24 years, respectively.⁸ The vast majority of F-16s were acquired

from 1978 thru 1992. The last F-15C/D was delivered in November 1989. To address this aging problem, the F-16 has undergone structural life extension programs, Falcon Up and Falcon STAR, to increase the jet's lifetime to 8,000 flight hours. The USAF also extended F-15C/D service life from 8,000 to 10,000 hours. However, these aged aircraft were grounded by the USAF after one F-15 "broke in half" during a November 2007 training mission.⁹ Subsequent inspections revealed multiple risks of catastrophic structural failure; as a result, the USAF retired some F-15s and temporarily restricted the flight profiles on other jets.

During testimony to Congress in May 2009, Gen Norton A. Schwartz, the USAF chief of staff, stated "Our aging air and space fleet requires focused attention," as he noted all legacy jets within the USAF fighter fleet (F-16, F-15, and A-10) had been grounded during the past two years.¹⁰ These aging effects will gravely affect ANG missions – nearly two-thirds of the ANG fleet (15 of the 23 fighter wings) will reach the end of their service life by 2020.^{11, 12}

Efforts to recapitalize the USAF fighter fleet have been stymied by repeated schedule delays and cost increases for the F-35 Lightning. In May 2009, the Congressional Budget Office (CBO) reported the F-35 production rate over the next 25 years was insufficient to keep pace with the rate 4th generation aircraft wear out.¹³ Consequently, the USAF fighter fleet would begin to experience a capability gap by 2020; this shortfall (relative to current requirements) would peak at 400 jets around 2025, and then gradually decrease. See Figure 1. The shaded regions illustrate a wide range of possible inventories from differing assumptions about F-35 production and service life of legacy 4th generation aircraft. For example, Lt Gen Daniel Darnell, (then) deputy chief of staff for USAF plans and requirements, testified before the Senate Armed Services Committee that the USAF fighter gap could exceed 800 jets by 2024.¹⁴

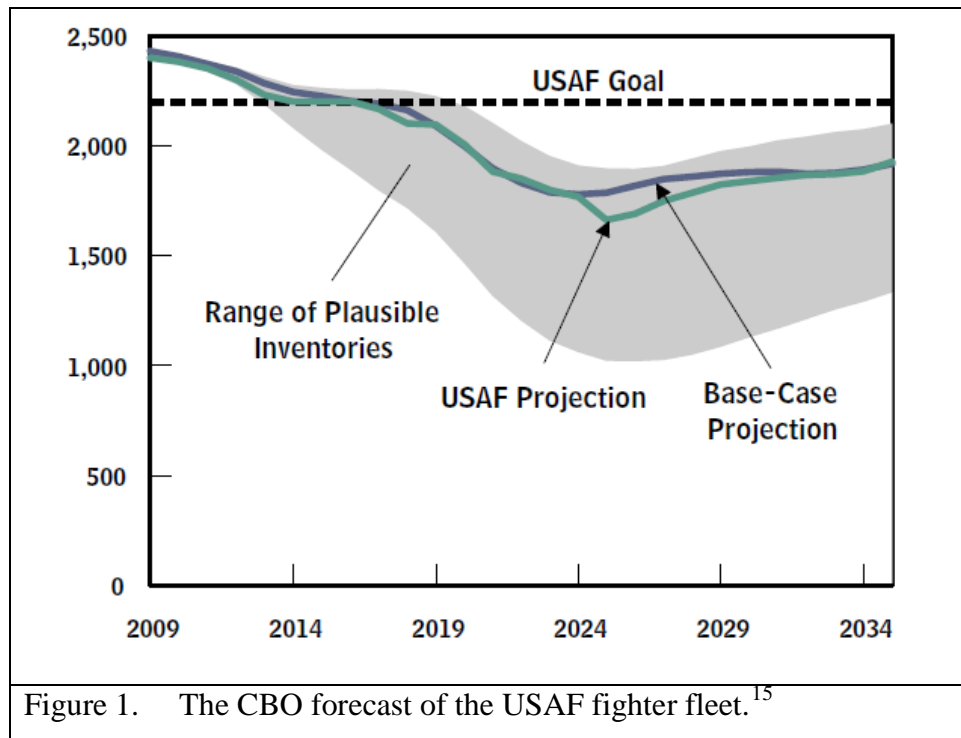


Figure 1. The CBO forecast of the USAF fighter fleet.¹⁵

The CBO further noted this USAF shortfall could be exacerbated by known risks to F-35 production. For example, the program could experience further schedule delays if significant technical problems arise during development and flight test, and similar to the F-22 program, additional increases to unit cost could mount pressure to reduce the F-35 fleet size.¹⁶ Finally, the CBO questioned if the projected F-35 production rate of 80 jets per year was achievable “under anticipated budget constraints.”¹⁷

According to their Congressional report published in May 2009, the General Accounting Office (GAO) assessed that completion of F-35 Litening development would require an additional one to three years and costs would correspondingly increase between \$2.4B and \$7.4B.¹⁸ The GAO assessment was primarily based on contract cost overruns and time expected to complete F-35 flight test. This aspect was noted as particularly troublesome due to added risk from concurrence (schedule overlap) of F-35 development and production phases. Facing more

slips to development, GAO questioned the rationale for the DOD plan to accelerate F-35 production. With significantly increased annual procurement rates, the DOD would make substantial investments – 273 aircraft at estimated cost of \$42B – before flight testing proves the 5th generation aircraft will perform as expected.¹⁹ This high-risk acquisition strategy has profound ramifications on future USAF combat capability and DOD budgets. The F-22 was produced in similar accelerated fashion; as a result, many F-22 Raptors require modification to become fully (Block 30) combat capable – at \$8B projected cost.²⁰

These reports join a long list of F-35 problems. As of December 2007, the F-35 total estimated acquisition cost was about \$300B, which included \$44B for development, \$254B for procurement, and \$500M in MilCon costs.²¹ F-35 program acquisition unit cost (PAUC) was about \$122M, and the average procurement unit cost (APUC) had exceeded \$104M.ⁱⁱⁱ From system development start (October 2001) to December 2007, the F-35 PAUC and APUC figures have increased 50%. During this period, the F-35 schedule was revised three times with a cumulative slip of two to three years.²²

The latest GAO estimate includes yet another schedule slip to complete F-35 development. As a result, GAO questioned the feasibility of F-35 production rate, which was subsequently accelerated by the FY10 defense budget.²³

The FY10 defense budget was a watershed event for the USAF fighter fleet by which DOD and USAF leaders have effectively *double-downed* their bets on F-35 fixing the USAF capability gap. In addition to accelerating F-35 production, the DOD ended F-22 production with 187 jets and hastened the retirement of 4th generation aircraft (F-16, F-15, and A-10). USAF leaders claimed the rationale for this restructuring plan was to “eliminate excessive

ⁱⁱⁱ PAUC is calculated by total development & procurement cost divided by total test & production aircraft. Sometimes referred as fly-away cost, APUC is total procurement cost divided by the production aircraft.

overmatch in our tactical fighter force and consider alternatives in our capabilities.”²⁴

Estimating that early retirement of 250 legacy fighters can save \$3.5B over the next five years, the USAF plans to redistribute those funds to higher priority missions and *build* a smaller, more capable force. General Schwartz described the strategy as follows:

“The force structure announcement reflects our best effort to meet the expanding Air Force mission areas and growing joint demands,”²⁵

However, the claims of a USAF fighter fleet “excessive overmatch” do not correlate with a revised national defense strategy but acceptance of higher risk in USAF capability to deter and defeat the myriad of adversaries that threaten our national interests. DOD and USAF leaders have conveyed that budgetary restrictions on limited resources – not a changing threat environment – are the primary cause for this fundamental shift in security policy.²⁶ The USAF fighter fleet is based on requirements determined during the Clinton administration. Over the past two decades, this force structure has successfully implemented the national defense strategies of Democratic and Republican administrations. The next QDR will undoubtedly document the requirement for a reduced USAF inventory of 4th and 5th generation aircraft. Nevertheless, (then) commander of Air Combat Command, Gen John Corley, stated in his letter to Senator Saxby Chambliss (R-GA) that decisions made within the FY10 defense budget, “... puts execution of our current national military strategy at high risk in the near to midterm.”²⁷

What is the *Super Falcon*?

Prior to decisions made within the FY10 defense budget, the CBO published a study, *Alternatives for Modernizing U.S. Fighter Forces*, which analyzed seven options to DOD's (then) plan of record.²⁸ The CBO alternatives included purchase of advanced versions of legacy fighters, which are frequently coined 4.5 generation aircraft. Within this study, the CBO analyzed the F-16 upgraded with "improved avionics, AESA radar, conformal fuel tanks for longer flight range, and strengthened airframe for carrying larger payloads."²⁹ The CBO noted that similar F-16s have been marketed to foreign militaries (currently to India), and an earlier version (F-16 Block 60 purchased by the United Arab Emirates) was an alternative to the F-35.

Subsequently in the FY10 defense budget, Section 133 of HR 2647, Congress mandated a follow-on study to include "the number of 4.5 generation fighter aircraft for procurement for fiscal years 2011 through 2025 necessary to fulfill the requirement of the Air Force to maintain not less than 2,200 tactical fighter aircraft," and "a discussion regarding the availability and feasibility of F-35s in fiscal years 2015 through fiscal year 2025 to proportionally and recapitalize the Air National Guard."³⁰ Section 133 of HR 2647 defined the 4.5 generation aircraft as "current fighter aircraft, including the F-15, F-16, and F-18, that 1) has advanced capabilities, including AESA radar, high capacity data-link, enhanced avionics; and 2) have the ability to deploy current and reasonably foreseeable advanced armaments."³¹

The USAF can acquire 4.5 generation fighters by augmenting current F-16 combat capability with readily available "off-the-shelf" upgrades in lethality and survivability. Widely acknowledged as the world's premier 4th generation multi-role fighter, the USAF F-16 combat capability is highlighted by the following:^{32, 33}

- Net-centric capable via Link-16 MIDS,³⁴
- Fully-integrated JHMCS with a suite of A-A & A-G weapons,³⁵
- Enhanced pilot situational awareness (SA) with colorized cockpit displays,
- Precision targeting via LITENING & SNIPER EO pods and HTS RF pod,^{36, 37, iv}
- Highly accurate/reliable/SAASM-compliant navigation via LN-260 EGI,³⁸
- Secure communications (including SATCOM) via ARC-210 radio,³⁹
- Comprehensive suite of A-A & A-G weapons

Of particular relevance to 4.5 generation criteria, the USAF is scheduled to upgrade their F-16s in CY12 by integrating AIM-120D and SDB I weapons with new “plug & play” capability.^{40, 41} The aircraft will have computations for a Common Weapon Engagement Zone (CWEZ) and the Universal Armament Interface (UAI), which greatly ease incorporation of future A-A and A-G weapons, respectively.⁴²

“Off-the-shelf” advancements in lethality and survivability are readily available for the Super Falcon to meet requirements of a 4.5 generation aircraft, as defined by Congress in Section 133 of HR 2647. First and foremost, AESA radar alternatives are numerous and available from multiple vendors. The aforementioned F-16 Block 60 jet (purchased by UAE) has the APG-80 AESA radar; more recently, vendors have marketed the USAF with AESA radars that require minimal integration to the current F-16 avionic architecture.⁴³ During the past year, one of these AESA radar alternatives was successfully fit-tested to the USAF F-16 jet.⁴⁴

To enhance interoperability between 4th and 5th generation aircraft, the USAF has analyzed and developed a high capacity data-link prototype for demonstration during *Empire*

^{iv} Since retirement of the F-4 Wild Weasels, the F-16 has been the sole USAF aircraft capable of performing the Suppression of Enemy Air Defense (SEAD) mission. The USAF recently retrofitted the F-16 fleet for dual EO and RF targeting pods to provide a Destruction of Enemy Air Defense (DEAD) capability in fair weather.

Challenge.^v The MADL (Multi-function Advanced Data Link) was chosen as the best cost/benefit alternative; the system would provide F-16s with capability to transmit & receive information with stealthy aircraft in anti-access environments.⁴⁵ Previously developed for several Foreign Military Sale (FMS) F-16 customers, the AIDEWS (Advanced Integrated Defensive Electronic Warfare Suite) provides advanced RF survivability with growth potential to “multi-spectral” aircraft protection.⁴⁶ To enhance pilot SA for complex and threat saturated missions, the USAF prototyped the F-16 cockpit with a large center pedestal display (CPD) that dual-functions for legacy flight instrumentation. Finally, the GE F110-132 engine (developed for the F-16 Block 60) would greatly improve aerodynamic performance because the 32,000 lbs of thrust provides 20% more than current F-16 engines.⁴⁷

How can the USAF acquire *Super Falcon* jet by 2020?

The USAF has two approaches for acquiring F-16 Super Falcons as the capability bridge during the transition from 4th to 5th generation multi-role aircraft. First, the USAF could buy new jets built from the F-16 production line, located at Fort Worth, Texas. The USAF could also fill the capability gap by upgrading some portion of the current F-16 fleet; however, the estimated retrofit cost would likely exclude the new engine from this second option.

Super Falcons could be built with little retooling of the F-16 production line because most features have been delivered to FMS customers. The 312th AESG/FM office *conservatively* estimated the unit cost for Super Falcon as \$53M per jet, which included \$43M fly-away cost, plus support/training equipment, technical orders, spares, and optional mission equipment.⁴⁸

^v *Empire Challenge* is an annual live joint and coalition intelligence, surveillance and reconnaissance (ISR) interoperability demonstration sponsored by the Under Secretary of Defense for Intelligence (USD/I).

This estimate included AIDEWS and AESA radar, but excludes MADL and CPD; however, their cost is likely comparable to Link-16 and current cockpit hardware, respectively. Similar to the AESA radar, the primary cost driver would be units for development, integration, and test efforts. The estimated cost for a fleet of 232 Super Falcons was \$13B spread over six to eight years, with most aircraft delivered by 2020.⁴⁹ Based on previous F-16 lifetimes, aircraft would likely remain in USAF service through 2050.

The USAF could also obtain Super Falcons by upgrading the current F-16 Block 50 fleet with the aforementioned capabilities.⁵⁰ Although retrofit for AIDEWS, MADL, or CPD has not been estimated, the 312th AESG/FM office anticipates the AESA radar mod would begin six years after program start and installs would require four years. AESA radar cost was estimated at \$1.5B, unit cost ~ \$5M per Block 50 jet. The F-16 modernization option would require another structural life extension program (SLEP) to increase jet lifetime to 10,000 flight hours. Based on USAF F-16 attrition rates, the 312th AESG/FM program office anticipates 234 Block 50 aircraft would be available for 10K SLEP.⁵¹ The F-16 depot, located at Hill AFB, Utah, would likely perform these modernization and SLEP programs. Based on their Falcon STAR performance, the depot production flow was estimated for 180 days; aircraft induction would start six years after program go-ahead and complete eight years thereafter. Estimated SLEP cost was \$1B, unit cost ~ \$4M per jet.⁵² On average, service life would be extended eight years, into the 2030–2040 decade.

Similar to CBO analysis on *Alternatives for Modernizing U.S. Fighter Forces*, the alternatives for Super Falcons should be analyzed based on relative merit to achieve national objectives for our military forces. Drew & Snow opined that decisions on US national security by senior policy makers should be risk management processes that obtain *means* necessary to

deter and defeat threats to our national interests.⁵³ In theory, the objective is risk (threat) management that will minimize expenditures from our national treasure (defense budget) and maximize equipment provided to our armed forces. We strive to get the “best bang for our buck.” In the global environment of the 21st century characterized by hybrid warfare, strategic success requires selection of *cost-effective* weapon systems that deter and defeat the myriad of threats to our national interests.

Based on data provided by 312th AESG/FM, the cost-effectiveness of purchasing new Super Falcons is clearly superior to SLEP/Mod of the current F-16 fleet. The age of Block 50 jets (approaching 20 years) negatively affects the return on investment for upgrading these into 4.5 generation aircraft. Furthermore, these jets would still exhibit unavoidable effects of aged aircraft and would be more expensive to operate than new Super Falcons. Most significantly, the SLEP/Mod programs would remove jets from operational status for 180 days – this would adversely impact USAF capability to execute combat mission needs.

Appropriation of \$13B for Super Falcons to fix the USAF capability gap would not be a trivial matter for our national policy decision makers. Decisions on United States security strategy are usually made after lengthy deliberations under national-level restrictions and many domestic influences. Drew & Snow claimed that organization bias and composition of national policy makers (consisting of career bureaucratic and political appointees) creates a very competitive atmosphere.⁵⁴ Consequently, national security decisions usually result as compromises among the diverse membership, and dramatic changes to the status quo are difficult because of bureaucratic momentum and “turf” battles. Even if DOD leadership provided a consensus strategy on the USAF capability gap, the current fiscal environment would require our national policy makers to choose a solution among no apparent good options.

Accounting for more than one-fourth of the \$53.6B for aircraft weapon programs, the FY10 defense budget recommendation (with no growth at the bottom-line) clearly indicates F-35 Litening is the senior leadership choice for manned aircraft.⁵⁵ Similar to opinions that some companies were “too big to fail” during the 2008 financial crisis, some F-35 proponents seem convinced that DOD has no other options for modernizing USN and USAF Fighter Fleets. Correspondingly, the DOD will probably not request funds to buy Super Falcons because F-35 will *not* be allowed to fail – this stealthy 5th generation jet was judged more capable while operating in denied access regions. However, the CBO caveat that F-35 survivability was tenuous and subject to countermeasures developed by future threats.⁵⁶

The senior policy makers in the Obama administration will probably not advocate for acquisition of Super Falcons over domestic needs with higher priority. Similar to the FY10 DOD budgetary decision on terminating F-22 production, they will likely concur with senior military leadership commitment to the F-35, which “has good qualities” according to General Schwartz, but not the same level of capability as the F-22.⁵⁷ Thus, Super Falcons must compete in the “zero-sum game” that appropriates funds to major weapon systems from the discretionary portion of the defense budget.

Within the FY10 defense budget, Section 133 of HR 2647, Congress adamantly stated their concerns over the ANG fleet. Responding to official announcements of the USAF restructure plan in May 2009, Rep Gabrielle Giffords (D-AZ) first noted that post-9/11 ANG missions are more multifaceted and complex. Representative Giffords then stated,

“The Air Force’s current road map, however, is a forecast for peril. If current plans continue, our Air Guard fleet of fighter aircraft will soon be crippled as airframes roll off the flight line with no operable replacement.”⁵⁸

Representative Giffords characterized DOD plans to fix the USAF capability gap with F-35 accelerated procurement as “foolhardy” with “unacceptable” level of risk. Echoed by Congressional requirements within Section 133 of HR 2647, Representative Giffords judged the gap must be filled by purchase of advanced 4th generation fighters coupled with SLEP of aircraft from the existing USAF inventory.⁵⁹ DOD leadership will likely push-back if Congress directs funds for these acquisitions come from the USAF total operational appropriation for aircraft. Within the FY10 defense budget recommendation, the USAF portion for F-35 exceeded \$4B. The next largest USAF aircraft program was \$1B for F-22, already cut by 80% in FY10.⁶⁰

Unless future defense budgets are supplemented with “congressional add” funds, the F-35 program would likely become the primary bill-payer to fix the USAF capability gap. However, the latter case could become a win-win solution. Over the decade long program, the USAF could partially fund Super Falcons with risk money reserved to cover the lengthy concurrence of F-35 development and production phases. Thus, funds become available by restructuring the F-35 program with lower risk. Decelerating F-35 production would save additional money by removing the need for cost-type contracts to buy F-35 jets over the next decade. In her exit memo on F-35 status, former USAF acquisition executive Sue Payton cited the program’s health as “mixed” due to cost increases, (development & production) concurrency, and the slow pace of flight test. She recommended USAF transition F-35 production from cost-type to fixed-price contracts, as soon as possible.⁶¹

Conclusion

During their testimony to Congress, the Honorable Michael Donley, secretary of the Air Force, and General Schwartz, made the following statement:

“Our Fiscal Year 2010 budget proposal reflects a commitment to the twelve Air Force Core Functions, ... Air Superiority and Global Precision Attack remain the foundations of our ability to deliver Global Power.”⁶²

The USAF has historically achieved and maintained air superiority with our fighter fleet. Air superiority and global precision attack resulted from the relative strength of our fighters by the synergistic effects of technically superior aircraft, numerical sufficiency, and exceptionally trained pilots and crews. All three elements are essential for air superiority over the modern battlefield, frequently characterized as hybrid warfare. Technical superiority alone is insufficient – numbers and training still matter. To deter and defeat the myriad of threats against United States national interests, the USAF requires *sufficient* multi-role fighters to perform air-to-air combat; air-to-ground strike missions with precision-guided munitions; and NTISR missions.⁶³

The USAF capability gap during transition from 4th to 5th generation aircraft has emerged from a *Perfect Storm* of interrelated factors. These include the increasing complexity and diversity of national interests and risks; the increase of aging effects on legacy 4th generation aircraft; the repeated schedule delays and cost increases for the F-35 Lightning; and intense domestic pressure on future DOD budgets.

F-35 Lightning cost increases and schedule delays necessitate a *cost-effective* capability bridge to transition the USAF from 4th to 5th generation multi-role aircraft. The F-16 Super

Falcon is singularly distinctive among potential solutions because the jet is available, affordable, and adaptable to the vast mission requirements of hybrid warfare. With unit cost of \$53M (less than 40% of the *latest* GAO estimate for F-35), the Super Falcons would be delivered by the existing F-16 production line.⁶⁴ Furthermore, these advanced 4.5 generation jets would be capable of operating within denied access regions against evolving threats. Although 5th generation aircraft exceed Super Falcon in stealth characteristics, total mission capability is difficult to quantify. The USAF fighter fleet does not operate independently, especially during initial campaign phases to disrupt and destroy the adversary's integrated air defense system (IADS). Comparable with the strategy to deny access, the USAF utilizes a systems approach to neutralize the IADS.

The USAF needs F-16 Super Falcons to maintain the *size and capability* essential for defending the national interests of the United States during the 2020–2040 timeframe.

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